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Project IMA: seamless predictions at the Royal Meteorological Institute of Belgium

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Seamless prediction systems are designed to deliver frequently updated forecasts that span various timescales by combining extrapolations of the most recent observations - such as weather radar data - with numerical weather prediction models. End users such as hydrological services, local authorities, smartphone users and the renewable energy sector, require increasingly early and accurate forecasts, especially for fields with a high spatiotemporal variability such as precipitation. Moreover, downstream impact models such as (urban) hydrological models have a strong nonlinear dependence on the meteorological input. So in addition to being fast and accurate, we also need calibrated ensembles of forecasts to conduct a proper error propagation to assess the impact uncertainty.

In response to these requirements, many national meteorological services have introduced seamless prediction systems, with notable examples including DWD's SINFONY, Met Office's IMPROVER, and Geosphere Austria's SAPHIR. In Belgium, Project IMA (after the Japanese word for "now" or "soon") represents the country' s seamless prediction approach, utilising the RMI's observations network, the gauge-corrected quantitative precipitation estimate RADQPE, the pysteps-be probabilistic rainfall nowcasting system, the INCA-BE analysis and nowcasting system, and the ACCORD NWP model configurations ALARO and AROME. Unlike many other seamless systems, Project IMA features seamless ensemble precipitation nowcasts from 0 to 6 hours, aimed to improve predictions of flash floods and their uncertainty.

We present the advancements within Project IMA and especially the novelties in pysteps. We share a glimpse of deep learning-based blending methods to extend forecast horizons and improve calibration, sharpness, and general utility for hydrologists, crisis managers, and other stakeholders.

Project IMA aims to integrate research swiftly into operational processes. It encourages contributing to open-source software such as pysteps, promoting transparency, reproducibility, and international collaboration, and supporting the UN's initiative for "Early Warnings for All"by 2027.

VAT

Session

Seamless Prediction: Blending and probabilistic techniques based on nowcasting and NWP ensembles

Preferred Contribution Type

Oral Presentation

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